

10. REHABILITATION FACILITIES

In this edition appendix material appears in the main body of the document; however, it remains advisory only.

10.1 General Considerations

Rehabilitation facilities may be organized under hospitals (organized departments of rehabilitation), outpatient clinics, rehabilitation centers, and other facilities designed to serve either single- or multiple-disability categories, including but not limited to: cerebrovascular, head trauma, spinal cord injury, amputees, complicated fractures, arthritis, neurological degeneration, genetic, and cardiac.

In general, rehabilitation facilities will have larger space requirements than general hospitals, have longer lengths of stay, and have less institutional and more residential environments.

10.1.A. Functional Units and Service Areas

Functional units and service areas shall include [the following](#):

10.1.A1. Required [patient](#) units. Each rehabilitation facility shall contain a medical evaluation unit and one or more of the following units:

- a. Psychological services unit.
- b. Social services unit.
- c. Vocational services.

10.1.A2. Required service areas. Each rehabilitation facility shall provide the following service areas, if [appropriate to the functional program and they are](#) not otherwise conveniently accessible to the facility ~~and appropriate to program functions~~:

- a. Patient dining, recreation, and day spaces.
- b. Dietary unit.
- c. Personal care facilities.
- d. Unit for teaching activities of daily living.
- e. Administration department.
- f. Engineering service and equipment areas.
- g. Linen service.
- h. Housekeeping rooms.
- i. Employees' facilities.
- j. Nursing unit.

10.1.A3. Optional units. The following special services areas, if required by the functional program, shall be provided as outlined in these sections. The sizes of the various ~~departments~~ units will depend upon the requirements of the ~~service to be provided~~ functional program:

- a. Sterilizing facilities.
- b. Physical therapy unit.
- c. Occupational therapy unit.
- d. Prosthetics and orthotics unit.
- e. Speech and hearing unit.
- f. Dental unit.
- g. Radiology unit.
- h. Pharmacy unit.
- i. Laboratory facilities.
- j. Home health service.
- k. Outpatient services.
- l. Therapeutic pool.
- m. Convenience store (i.e., expanded gift shop) with toiletries and other items ~~accessible~~ available to patients during extended ~~lengths of stays~~.

10.2 Evaluation Unit

10.2.A. Office(s) for Personnel

10.2.B. Examination Room(s)

Examination rooms shall have a minimum floor area of 140 square feet (13.01 square meters), excluding such spaces as the vestibule, toilet, closet, and work counter (whether fixed or movable). The minimum room dimension shall be 10 feet (3.05 meters). The room shall contain a handwashing station, a work counter, ~~and~~ storage facilities, and a desk, counter, or shelf space for writing.

10.2.C. Evaluation Room(s)

Evaluation rooms ~~areas~~ shall be arranged to permit appropriate evaluation of patient needs and progress and to determine specific programs of rehabilitation. Rooms shall include a desk and work area for the evaluators; writing and work space for patients; and storage for supplies. Where the facility is small and workload light, evaluation ~~may be done~~ shall be permitted in ~~the~~ examination room(s).

10.2.D. Laboratory Facilities

Facilities shall be provided within the rehabilitation department or through contract arrangement with a

nearby hospital or laboratory service for hematology, clinical chemistry, urinalysis, cytology, pathology, and bacteriology. If these facilities are provided through contract, the following minimum laboratory services shall be provided in the rehabilitation facility:

10.2.D1. Laboratory work counter(s) with a sink, and gas and electric service.

10.2.D2. Handwashing stations.

10.2.D3. Storage cabinet(s) or closet(s).

10.2.D4. Specimen collection facilities. Urine collection rooms shall be equipped with a water closet and ~~lavatory~~handwashing station. Blood collection facilities shall have space for a chair and work counter.

10.2.E. Imaging Facilities

The following special services areas, if required by the functional program, shall be provided as outlined in Section 7.10.E. The sizes of the various ~~departments~~areas will depend upon the requirements of the service to be provided.

10.2.E1. Electromyography.

10.2.E2. CAT scan.

10.2.E3. MRI.

10.2.E4. Nuclear medicine.

10.2.E5. Radiographic.

10.3 Psychological Services Unit

~~This shall include~~ Office(s) and work space shall be provided for testing, evaluation, and counseling.

10.4 Social Services Unit

~~This shall include~~ Office space(s) shall be provided for private interviewing and counseling.

10.5 Vocational Services Unit

Office(s) and work space shall be provided for vocational training, counseling, and placement ~~shall be provided~~.

10.6 Dining, Recreation, and Day Spaces

The following standards shall be met for patient dining, recreation, and day spaces (areas may be in separate or adjoining spaces):

10.6.A. Inpatients and Residents Spaces

A total of 55 square feet (5.11 square meters) per bed.

10.6.B. Outpatients Spaces

If dining is part of the day care program, a total of 55 square feet (5.11 square meters) per person shall be provided. If dining is not part of the program, at least 35 square feet (3.25 square meters) per person shall be provided for recreation and day spaces. A handwashing station shall be provided in each dining room.

10.6.C. Storage

Storage spaces shall be provided for recreational equipment and supplies.

10.7 Dietary Department

***10.7.A. General**

Construction, equipment, and installation of food service facilities shall meet the requirements of the functional program. ~~Services may consist of an on-site conventional food preparation system, a convenience food service system, or an appropriate combination thereof. On-site facilities should be provided for emergency food preparation and refrigeration.~~

The following facilities shall be provided as required to implement the food service selected:

10.7.A1. A control station for receiving food supplies.

10.7.A2. Food preparation facilities. Conventional food preparation systems require space and equipment for preparing, cooking, and baking. Convenience food service systems such as frozen prepared meals, bulk packaged entrees, individually packaged portions, and contractual commissary services require space and equipment for thawing, portioning, cooking, and/or baking.

10.7.A3. Handwashing station(s) located in the food preparation area.

10.7.A4. Patients' meal service facilities for tray assembly and distribution.

10.7.A5. Separate dining space ~~shall be provided~~ for staff.

10.7.A6. Ware_washing space. This shall be located in a room or ~~an~~ alcove separate from the food preparation and serving area. Commercial dishwashing equipment shall be provided. Space shall also be provided for receiving, scraping, sorting, and stacking soiled tableware and for transferring clean tableware to the using areas. A ~~lavatory~~ handwashing station shall be conveniently available.

10.7.A7. Pot_washing facilities.

10.7.A8. Storage areas for cans, carts, and mobile tray conveyors.

10.7.A9. Waste storage facilities. These shall be located in a separate room easily accessible to the outside for direct waste pickup or disposal.

10.7.A10. Office(s) or desk spaces for dietitian(s) or the dietary service manager.

10.7.A11. Toilets for dietary staff. Handwashing stations shall be immediately available.

10.7.A12. Housekeeping room. This shall be located within the dietary department and shall contain a floor receptor or service sink and storage space for housekeeping equipment and supplies.

10.7.A13. Self-dispensing ice-making facilities. ~~This~~ These may be in an area or room separate from the food preparation area but ~~must~~ shall be easily cleanable and convenient to dietary facilities.

10.8 Personal Care Unit for Inpatients

A separate room with appropriate fixtures and utilities shall be provided for patient grooming. The activities for daily living unit may serve this purpose.

10.9 Activities for Daily Living Unit

A unit for teaching daily living activities shall be provided. It shall include a bedroom, bath, kitchen, and space for training stairs. Equipment shall be functional. The bathroom ~~must~~ shall be ~~an~~ in addition to other toilet and bathing requirements. The facilities ~~should~~ shall be similar to a residential environment so that ~~the~~ patients ~~may~~ can learn to use ~~them~~ those at home.

10.10 Administration and Public Areas

10.10.A. Entrance

A grade-level entrance, sheltered from the weather and able to accommodate wheelchairs, shall be provided.

10.10.B. Lobby

The lobby shall include the following:

10.10.B1. Wheelchair storage space(s).

10.10.B2. A reception and information counter or desk.

10.10.B3. Waiting space(s).

10.10.B4. Public toilet facilities.

10.10.B5. Public telephone(s).

10.10.B6. Drinking fountain(s).

10.10.B7. Convenience store (as described in Section 10.1.A3.m).

10.10.C. Interview Space(s)

Space for private interviews relating to social service, credit, and admissions ~~shall be provided if not provided under Section 10.1.A1.~~

10.10.D. General or Individual Office(s)

General or individual offices for business transactions, records, and administrative and professional staffs ~~shall be provided if not provided under Section 10.1.A2.~~

10.10.E. Multipurpose Room(s)

Multipurpose room(s) for conferences, meetings, health education, and library services shall be provided.

10.10.F. Patient Storage

~~Due to their longer length of stay being longer than that of typical acute care patients, rehab patients may require more space for storage of patients' personal effects shall meet the needs of the functional program.~~

10.10.G. General Storage

Separate space for office supplies, sterile supplies, pharmaceutical supplies, splints and other orthopedic supplies, and housekeeping supplies and equipment shall be provided.

10.11 Engineering Service and Equipment Areas

10.11.A. Equipment Rooms

Rooms for boilers, mechanical equipment, and electrical equipment shall be provided.

10.11.B. Storage Room(s)

Storage rooms for building maintenance supplies and yard equipment shall be provided.

10.11.C. Waste Processing Services

10.11.C1. Space and facilities shall be provided for the sanitary storage and disposal of waste.

10.11.C2. If provided, design and construction of incinerators and trash chutes shall be in accordance with NFPA 82 and ~~shall also conform to~~ the requirements prescribed by environmental regulations.

10.12 Linen Services

10.12.A. On-site Processing

If linen is to be processed on the site, the following shall be provided:

10.12.A1. Laundry processing room with commercial equipment that can process seven days' laundry within a regularly scheduled workweek. ~~A~~ Handwashing station shall be provided.

10.12.A2. Soiled linen receiving, holding, and sorting room with handwashing station and cart-washing facilities.

10.12.A3. Storage for laundry supplies.

10.12.A4. Clean linen storage, issuing, and holding room or area.

10.12.A5. Housekeeping room, containing a floor receptor or service sink and storage space for housekeeping equipment and supplies.

10.12.B. Off-site Processing

If linen is processed off the rehabilitation facility site, the following shall be provided:

10.12.B1. Soiled linen holding room.

10.12.B2. Clean linen receiving, holding, inspection, and storage room(s).

10.13 Housekeeping Room(s)

In addition to the housekeeping rooms called for in certain departments, housekeeping rooms shall be provided throughout the facility as required to maintain a clean and sanitary environment. Each shall contain a floor receptor or service sink and storage space for housekeeping supplies and equipment.

10.14 Employee Facilities

In addition to the employee facilities such as locker rooms, lounges, toilets, or showers called for in certain departments, a sufficient number of such facilities to accommodate the needs of all personnel and volunteers shall be provided.

10.15 Nursing Unit (for Inpatients)

Where inpatients are a part of the facility, each nursing unit shall provide the following:

10.15.A. Patient Rooms

Each patient room shall meet the following requirements:

10.15.A1. Maximum room occupancy shall be four patients. Larger units ~~may be provided shall be permitted~~ if justified by the functional program. At least two single-bed rooms with private toilet rooms shall be provided for each nursing unit.

10.15.A2. Minimum room areas exclusive of toilet rooms, closets, lockers, wardrobes, alcoves, or vestibules shall be 140 square feet (13.01 square meters) in single-bed rooms and 125 square feet (11.61 square meters) per bed in multiple-bed rooms. In multiple-bed rooms, a clearance of 3 feet 8 inches (1.12 meters) shall be maintained at the foot of each bed to permit the passage of equipment and beds.

10.15.A3. Each patient sleeping room shall have a window in accordance with Sections ~~7.28.A11~~ 10.24.A7, 10.24.A8, and 10.24.A9.

10.15.A4. A nurses' calling system shall be provided.

10.15.A5. Handwashing stations shall be provided in each patient room.

10.15.A6. Each patient shall have access to a toilet room without having to enter the general corridor area. One toilet room shall serve no more than four beds and no more than two patient rooms. The toilet room shall contain a water closet and a handwashing station. The handwashing station may be omitted from a toilet room that serves single-bed and two-bed rooms if each such patient's room contains a handwashing station. Each toilet room shall be of sufficient size to ensure that wheelchair users will have access.

10.15.A7. Each patient shall have a wardrobe, closet, or locker with minimum clear dimensions of 1 foot 10 inches (558.8 millimeters) by 1 foot 8 inches (508 millimeters). An adjustable clothes rod and adjustable shelf shall be provided.

10.15.A8. Visual privacy shall be provided for each patient in multiple-bed rooms.

10.15.B. Service Areas

The service areas noted ~~below~~ in Sections 10.15.B1 through 10.15.B16 shall be in or readily available to each nursing unit. The size and disposition of each service area ~~will depend upon the number and types of~~

~~disabilities for which care will be provided~~ shall meet the needs of the functional program. Although identifiable spaces are required for each indicated function, consideration ~~will~~ shall be given to alternative designs that accommodate some functions without designating specific areas or rooms. ~~Such proposals shall be submitted for prior approval.~~ Each service area may be arranged and located to serve more than one nursing unit, but at least one such service area shall be provided on each nursing floor. The following service areas shall be provided:

10.15.B1. Administrative center or nurses' station.

10.15.B2. Nurses' office.

10.15.B3. Storage for administrative supplies.

10.15.B4. Handwashing stations located near the nurse station and the drug distribution station. One ~~lavatory~~ handwashing station may serve both areas.

10.15.B5. Charting facilities for nurses and doctors.

10.15.B6. Lounge and toilet room(s) for staff.

10.15.B7. Individual closets or compartments for safekeeping personal effects of nursing personnel, located convenient to the duty station or in a central location.

10.15.B8. Room for examination and treatment of patients. ~~This room may be omitted if all patient rooms are single bed rooms.~~ ~~If This room~~ shall have a minimum floor area of 120 square feet (11.15 square meters), excluding space for vestibules, toilet, closets, and work counters (whether fixed or movable). The minimum room dimension shall be 10 feet (3.05 meters). The room shall contain a handwashing station, work counter, storage facilities, and a desk, counter, or shelf space for writing. ~~This room may be omitted if all patient rooms are single-bed rooms.~~ The examination room in the evaluation unit may be used if it is conveniently located.

10.15.B9. Clean workroom or clean holding room.

10.15.B10. Soiled workroom *or* soiled holding room.

10.15.B11. Medication station. Provisions shall be made for convenient and prompt 24-hour distribution of medicine to patients. Distribution may be from a medicine preparation room, a self-contained medicine dispensing unit, or through another approved system. If used, a medicine preparation room shall be under the nursing staff's visual control and contain a work counter, refrigerator, and locked storage for biologicals and drugs. A medicine dispensing unit may be located at a nurse station, in the clean workroom, or in an alcove or other space under direct control of nursing or pharmacy staff.

10.15.B12. Clean linen storage. A separate closet or an area within the clean workroom shall be provided for this purpose. If a closed-cart system is used, storage may be in an alcove.

10.15.B13. Nourishment station. This shall be accessible to patients and contain a handwashing station, equipment for serving nourishment between scheduled meals, a refrigerator, storage cabinets, and ice maker-dispenser units to provide for patient service and treatment.

10.15.B14. Equipment storage room. This shall be for equipment such as I-V stands, inhalators, air

mattresses, and walkers.

10.15.B15. Parking for stretchers and wheelchairs. This shall be located out of the path of normal traffic.

10.15.B16. Multipurpose day room. Due to patients' length of stay, a day room shall be provided for patients to socialize on the unit.

10.15.C. Patient Bathing Facilities

Bathtubs or showers shall be provided at a ratio of one bathing facility for each eight beds not otherwise served by bathing facilities within patient rooms. Each tub or shower shall be in an individual room or privacy enclosure that provides space for the private use of bathing fixtures, for drying and dressing, and for a wheelchair and an assistant. Showers in central bathing facilities shall be at least 4 feet (1.22 meters) square, curb-free, and designed for use by a wheelchair patient.

10.15.D. Patient Toilet Facilities

10.15.D1. A toilet room that does not require travel through the general corridor shall be accessible to each central bathing area.

10.15.D2. Doors to toilet rooms shall have a minimum width of 2 feet 10 inches (863.6 millimeters) to admit a wheelchair. The doors shall permit access from the outside in case of an emergency.

10.15.D3. A handwashing station shall be provided for each water closet in each multi-fixture toilet room.

10.15.E. The need for and number of required airborne infection isolation rooms in the rehabilitation facility shall be determined by an infection control risk assessment. When required, the airborne infection isolation room(s) shall comply with the general requirements of Section 7.2.C. The use may be located within individual nursing units and used for normal acute care when not required for isolation cases, or they may be grouped as a separate isolation unit.

10.16 Sterilizing Facilities

Where required by the functional program, a system for sterilizing equipment and supplies shall be provided.

10.17 Physical Therapy Unit

The following elements shall be provided: (Items 10.17.A, B, E, F, and G may be planned and arranged for shared use by occupational therapy patients and staff if the functional program reflects this sharing concept.)

10.17.A. Office Space

10.17.B. Waiting Space

10.17.C. Treatment Area(s)

For thermotherapy, diathermy, ultrasonics, hydrotherapy, etc., cubicle curtains shall be provided around each individual treatment area ~~shall be provided~~. Handwashing station(s) shall also be provided. One handwashing station may serve more than one cubicle. Facilities for collection of wet and soiled linen and other material shall be provided. As a minimum, one individual treatment area shall be enclosed within

walls and have a door for access—minimum size 80 square feet (7.44 square meters). Curtained treatment areas shall have a minimum size of 70 square feet (6.51 square meters).

10.17.D. ~~An~~ Exercise Area

Space requirements shall be designed to permit access to all equipment and be sized to accommodate equipment for physical therapy.

10.17.E. Storage for Clean Linen, Supplies, and Equipment

10.17.F. Patients' Dressing Areas, Showers, Lockers, and Toilet Rooms

~~Patients' dressing areas, showers, lockers, and toilet rooms~~ These shall be provided as required by the functional program.

10.17.G. Wheelchair and Stretcher Storage

~~(Items 10.17.A, B, E, F, and G may be planned and arranged for shared use by occupational therapy patients and staff if the functional program reflects this sharing concept.)~~

10.18 Occupational Therapy Unit

The following elements shall be provided. (Items 10.18.A, B, D, and E may be planned and arranged for shared use by physical therapy patients and staff if the functional program reflects this sharing concept.)

10.18.A. Office Space

10.18.B. Waiting Space

10.18.C. Activity Areas

~~Provisions shall be made for a sink or lavatory and for the collection of waste products prior to disposal.~~

10.18.D. Storage for Supplies and Equipment

10.18.E. Patients' Dressing Areas, Showers, Lockers, and Toilet Rooms

~~Patients' dressing areas, showers, lockers, and toilet rooms~~ These shall be provided as required by the functional program.

~~(Items 10.18.A, B, D, and E may be planned and arranged for shared use by physical therapy patients and staff if the functional program reflects this sharing concept.)~~

10.19 Prosthetics and Orthotics Unit

The following elements shall be provided:

10.19.A. Workspace for Technician(s)

10.19.B. Space for Evaluation and Fitting

This shall include provision for privacy.

10.19.C. Space for Equipment, Supplies, and Storage

10.20 Speech and Hearing Unit

This shall include [the following](#):

10.20.A. Office(s) for Therapists

10.20.B. Space for Evaluation and Treatment

10.20.C. Space for Equipment and Storage

10.21 Dental Unit

The following elements shall be provided if required by the functional program:

10.21.A. Operatory

This shall contain a handwashing station.

10.21.B. Laboratory and Film Processing Facilities

10.22 Imaging Suite

This unit shall contain [the following elements](#):

~~10.22.A. Imaging room(s) shall be provided~~ as required by the functional program. (See Section 7.10 for special requirements.)

10.23 Pharmacy Unit

The size and type of services to be provided in the pharmacy will depend ~~up~~ upon the drug distribution system chosen and whether the facility proposes to provide, purchase, or share pharmacy services. ~~This shall be explained in the functional program.~~ If a pharmacy is required by the functional program, provisions shall be made for the following functional areas:

10.23.A. A Dispensing Area with a Handwashing Station

10.23.B. An Editing or Order Review Area

10.23.C. An Area for Compounding

10.23.D. Administrative Areas

10.23.E. Storage Areas

10.23.F. A Drug Information Area

10.23.G. A Packaging Area

10.23.H. A Quality-Control Area

10.24 Details and Finishes

Patients in a rehabilitation facility will be disabled to differing degrees. Therefore, high standards of safety for the occupants shall be provided to minimize accidents. All details and finishes for renovation projects as well as for new construction shall comply with the following requirements insofar as they affect patient services:

10.24.A. Details

10.24.A1. Compartmentation, exits, automatic extinguishing systems, and other details relating to fire prevention and fire protection in inpatient rehabilitation facilities shall comply with requirements listed in NFPA 101. In freestanding outpatient rehabilitation facilities, details relating to exits and fire safety shall comply with the appropriate occupancy chapter of NFPA 101 and the requirements outlined herein.

10.24.A2. Items such as drinking fountains, telephone booths, vending machines, and portable equipment shall not restrict corridor traffic or reduce the corridor width below the required minimum.

10.24.A3. Rooms containing bathtubs, sitz baths, showers, and water closets subject to patient use shall be equipped with doors and hardware that will permit access from the outside in an emergency. When such rooms have only one opening or are small, the doors shall open outward or be otherwise designed to open without pressing against a patient who may have collapsed within the room.

10.24.A4. Minimum width of all doors to rooms needing access for beds shall be 3 feet 8 inches (1.12 meters). Doors to rooms requiring access for stretchers and doors to patient toilet rooms and other rooms needing access for wheelchairs shall have a minimum width of 2 feet 10 inches (.86 meter). Where the functional program states that the sleeping facility will be for residential use (and therefore not subject to in-bed patient transport), patient room doors may be 3 feet (0.91 meter) wide, if approved by the local authority having jurisdiction.

10.24.A5. Doors between corridors and rooms or those leading into spaces subject to occupancy, except elevator doors, shall be swing-type. Openings to showers, baths, patient toilets, and other small, wet-type areas not subject to fire hazard are exempt from this requirement.

10.24.A6. Doors, except those to spaces such as small closets not subject to occupancy, shall not swing into corridors in a manner that obstructs traffic flow or reduces the required corridor width.

10.24.A7. Windows shall be designed to prevent accidental falls when open, or shall be provided with security screens where deemed necessary by the functional program.

10.24.A8. Windows and outer doors that may be frequently left open shall be provided with insect screens.

10.24.A9. ~~Patient rooms intended for 24-hour occupancy shall have windows that operate without the use of tools and shall have sills not more than 3 feet (0.91 meter) above the floor. Operable windows are not required in patient rooms.~~

10.24.A10. Doors, sidelights, borrowed lights, and windows glazed to within 18 inches (457.2 millimeters) of the floor shall be constructed of safety glass, wired glass, or plastic glazing material that resists breaking or creates no dangerous cutting edges when broken. Similar materials shall be used in wall openings of playrooms and exercise rooms. Safety glass or plastic glazing material shall be used for shower doors and

bath enclosures.

10.24.A11. Linen and refuse chutes shall comply with NFPA 101.

10.24.A12. Thresholds and expansion joint covers shall be flush with the floor surface to facilitate use of wheelchairs and carts in new facilities.

10.24.A13. Grab bars shall be provided at all patient toilets, bathtubs, showers, and sitz baths. The bars shall have 1-1/2 inches (38.1 millimeters) clearance to walls and shall be sufficiently anchored to sustain a concentrated load of 250 pounds (113.4 kilograms). Special consideration shall be given to shower curtain rods ~~which~~ that may be momentarily used for support.

10.24.A14. Recessed soap dishes shall be provided in showers and bathrooms.

10.24.A15. Handrails shall be provided on both sides of corridors used by patients. A clear distance of 1-1/2 inches (38.1 millimeters) shall be provided between the handrail and the wall, and the top of the rail shall be about 32 inches (812.8 millimeters) above the floor, except for special care areas such as those serving children.

10.24.A16. Ends of handrails and grab bars shall be constructed to prevent snagging the clothes of patients.

10.24.A17. Handwashing stations. Location and arrangement of handwashing stations shall permit proper use and operation and meet the following:-

a. Particular care ~~should~~ shall be given to clearance required for blade-type operating handles.

b. Lavatories intended for use by disabled patients shall be installed ~~to permit wheelchairs to slide under them~~ in accordance with Section 1-4, Design Standards for the Disabled.

c. Provisions for hand drying shall be included at all handwashing stations.

d. Lavatories and handwashing stations shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113.4 kilograms) on the front of the fixture.

10.24.A18. Mirrors shall be arranged for convenient use by wheelchair patients as well as by patients in a standing position.

~~**10.24.A19.** Provisions for hand drying shall be included at all handwashing stations.~~

~~**10.24.A20.** Lavatories and handwashing stations shall be securely anchored to withstand an applied vertical load of not less than 250 pounds (113.4 kilograms) on the front of the fixture.~~

10.24.A1921. Radiation protection requirements of ~~X~~ x-ray and gamma ray installations shall conform to ~~necessary~~ state and local laws. Provisions shall be made for testing the completed installation before use. All defects ~~must~~ shall be corrected before acceptance.

10.24.A2022. The minimum ceiling height shall be 7 feet 10 inches (2.39 meters), with the following exceptions:

- a. Boiler rooms shall have a ceiling clearance not less than 2 feet 6 inches (762 millimeters) above the main boiler header and connecting piping.
- b. Ceilings of radiographic and other rooms containing ceiling-mounted equipment, including those with ceiling-mounted surgical light fixtures, shall have sufficient height to accommodate the equipment and/or fixtures.
- c. Ceilings in corridors, storage rooms, toilet rooms, and other minor rooms ~~may~~ shall be not less than 7 feet 8 inches (2.34 meters).
- d. Suspended tracks, rails, and pipes located in the path of normal traffic shall be not less than 6 feet 8 inches (2.03 meters) above the floor.

~~10.24.A23. Recreation rooms, exercise rooms, and similar spaces where impact noises may be generated shall not be located directly over patient bed areas unless special provisions are made to minimize such noise.~~

10.24.A2124. Rooms containing heat-producing equipment (such as boiler or heater rooms and laundries) shall be insulated and ventilated to prevent any floor surface above from exceeding a temperature 10°F (6°C) above the ambient room temperature.

10.24.A2225. Noise reduction criteria shown in Table 7.1 shall apply to partition, floor, and ceiling construction in patient areas. Recreation rooms, exercise rooms, and similar spaces where impact noises may be generated shall not be located directly over patient bed areas unless special provisions are made to minimize such noise.

10.24.B. Finishes

10.24.B1. Cubicle curtains and draperies shall be noncombustible or rendered flame retardant and shall pass both the large- and small-scale tests in NFPA 701.

10.24.B2. Floor materials shall be readily cleanable and appropriately wear-resistant for the location. Floor surfaces in patient areas shall be smooth and without irregular surfaces to prevent tripping by patients using orthotic devices. Floors in food preparation or assembly areas shall be water-resistant. Joints in tile and similar material in such areas shall also be resistant to food acids. In all areas frequently subject to wet cleaning methods, floor materials shall not be physically affected by germicidal and cleaning solutions. Floors subject to traffic while wet, such as shower and bath areas, kitchens, and similar work areas, shall have a nonslip surface.

10.24.B3. Wall bases in kitchens, soiled workrooms, and other areas that are frequently subject to wet cleaning methods shall be monolithic and coved with the floor, tightly sealed within the wall, and constructed without voids that can harbor insects.

10.24.B4. Wall finishes shall be washable and, in the proximity of plumbing fixtures, shall be smooth and moisture-resistant. Finish, trim, and floor and wall construction in dietary and food preparation areas shall be free from spaces that can harbor pests.

10.24.B5. Floor and wall areas penetrated by pipes, ducts, and conduits shall be tightly sealed to minimize entry of pests. Joints of structural elements shall be similarly sealed.

10.24.B6. Ceilings throughout shall be readily cleanable. All overhead piping and ductwork in the dietary and food preparation area shall be concealed behind a finished ceiling. Finished ceilings may be omitted in mechanical and equipment spaces, shops, general storage areas, and similar spaces, unless required for fire-resistive purposes.

10.24.B7. Acoustical ceilings shall be provided for corridors in patient areas, nurse stations, day rooms, recreational rooms, dining areas, and waiting areas.

10.25 Design and Construction, Including Fire-Resistant Standards

10.25.A. Design

Except as noted below, construction of freestanding outpatient rehabilitation facilities shall adhere to recognized national model building codes and/or to NFPA 101 and the minimum requirements contained herein. Rehabilitation facilities that accommodate inpatients shall comply with the construction requirements for general hospitals ~~as indicated in Section Chapter~~ 7.

10.25.B. Interior Finishes

Interior finish materials for inpatient facilities shall comply with the flame-spread limitations and the smoke-production limitations ~~set forth~~ in NFPA 101.

10.25.C. Insulation Materials

Building insulation materials, unless sealed on all sides and edges, shall have a flame-spread rating of 25 or less and a smoke-developed rating of 150 or less when tested in accordance with NFPA 255-~~1984~~.

10.25.D. Provisions for Natural Disasters

For design and construction standards relating to hurricanes, tornadoes, and floods, see Section 7.29.F.

10.26-10.29 Reserved

10.30 Special Systems

10.30.A. General

10.30.A1. Prior to acceptance of the facility, all special systems shall be tested and operated to demonstrate to the owner or his designated representative that the installation and performance of these systems conform to design intent. Test results shall be documented for maintenance files.

10.30.A2. Upon completion of the special systems equipment installation contract, the owner shall be furnished with a complete set of manufacturers' operating, maintenance, and preventive maintenance instructions, ~~a~~-parts lists, and complete procurement information, including equipment numbers and descriptions. Operating staff persons shall also be provided with instructions for proper operation of systems and equipment. Required information shall include all safety or code ratings as needed.

10.30.A3. Insulation shall be provided surrounding special system equipment to conserve energy, protect personnel, and reduce noise.

10.30.B. Elevators

10.30.B1. All buildings having patient facilities (such as bedrooms, dining rooms, or recreation areas) or critical services (such as diagnostic or therapy) located on other than the main entrance floor shall have

electric or hydraulic elevators. Installation and testing of elevators shall comply with ANSI/ASME A17.1, ANSI/ASME A17.3, or UFAS.

a. The number of elevators required shall be determined from a study of the facility plan and of the estimated vertical transportation requirements.

b. Hospital-type elevator cars shall have inside dimensions that accommodate a patient bed with attendants. Cars shall be at least 5 feet 8 inches (1.73 meters) wide by 9 feet (2.74 meters) deep. Car doors shall have a clear opening of not less than 4 feet (1.22 meters) wide and 7 feet (2.13 meters) high. In renovations, existing elevators that can accommodate patient beds used in the facility will not be required to be increased in size.

c. Elevator call buttons and controls shall not be activated by heat or smoke. Light beams, if used for operating door reopening devices without touch, shall be used in combination with door-edge safety devices and shall be interconnected with a system of smoke detectors. This is so that the light control feature will be overridden or disengaged should it encounter smoke at any landing.

10.30.B2. Field inspections and tests shall be made and the owner shall be furnished with written certification stating that the installation meets the requirements set forth in this section as well as all applicable safety regulations and codes.

10.30.C. Waste Processing Services

~~10.30.C1. Storage and disposal. Facilities shall be provided for sanitary storage and treatment or disposal of waste using techniques acceptable to the appropriate health and environmental authorities. The functional program shall stipulate the categories and volumes of waste for disposal and shall stipulate the methods of disposal for each.~~

~~10.30.C2. Medical waste. Medical waste shall be disposed of either by incineration or other approved technologies. Incinerators or other major disposal equipment may be shared by two or more institutions.~~

*10.30.C1. Collection and storage. Waste collection and storage locations shall be determined by the facility as a component of the functional program. The functional program shall stipulate the categories and volumes of waste for disposal and the methods of handling and disposal of waste. The functional program shall outline the space requirements, including centralized waste collection and storage spaces. Size of spaces shall be determined based upon volume of projected waste and length of anticipated storage.

a. At docks or other waste removal areas, the functional program shall stipulate the location of compactors, balers, sharps, and recycling container staging. Red bag waste shall be staged in enclosed and secured areas. Biohazardous and environmentally hazardous materials, including mercury, nuclear reagent waste, and other regulated waste types, shall be segregated and secured.

b. If provided, regulated medical waste or infectious waste storage spaces shall have a floor drain, cleanable floor and wall surfaces, lighting, and exhaust ventilation, and should be safe from weather, animals and unauthorized entry. Refrigeration requirements for such storage facilities shall comply with state and/or local regulations.

10.30.C2 Waste treatment and disposal technologies.

*a. On-site hospital incinerators shall comply with federal, state, and local regulatory and environmental

requirements. The design and construction of incinerators and trash chutes shall comply with NFPA 82.

*b. Types of non-incineration waste treatment technology(ies) shall be determined by the facility in conjunction with environmental, economic, and regulatory considerations. The functional program shall describe waste treatment technology components.

(1) In determining the location for a non-incineration technology, safe transfer routes, distances from waste sources, temporary storage requirements, as well as space requirements for treatment equipment shall be considered. The location of the technology shall not cause traffic problems as waste is brought in and out. Odor, noise, and the visual impact of medical waste operations on patients, visitors, public access and security shall be considered.

(2) Space requirements for such technologies shall be determined by the equipment requirements, including associated area for opening waste entry doors, access to control panels, space for hydraulic lifts, conveyors, and operational clearances. Mobile or portable units, trailer-mounted units, underground installations, or all-weather enclosed shelters at an outdoor site may also be used, subject to local regulatory approvals.

(3) Exhaust vents, if any, from the treatment technology shall be located a minimum of 75 feet (22.86 meters) from inlets to HVAC systems. If the technology involves heat dissipation, sufficient cooling and ventilation shall be provided.

10.31 Mechanical Standards

10.31.A. General

10.31.A1. The mechanical system ~~should~~shall be designed for overall efficiency and life cycle costing. Details for cost-effective implementation of design features are interrelated and too numerous (as well as too basic) to list individually. Recognized engineering procedures shall be followed for the most economical and effective results. A well-designed system can generally achieve energy efficiency at minimal additional cost and simultaneously provide improved patient comfort. Different geographic areas may have climatic and use conditions that favor one system over another in terms of overall cost and efficiency. In no case shall patient care or safety be sacrificed for conservation.

~~Mechanical, electrical, and HVAC equipment may be located either internally, externally, or in separate buildings.~~

10.31.A2. Remodeling and work in existing facilities may present special problems. As practicality and funding permit, existing insulation, weather stripping, etc., ~~should~~shall be brought up to standard for maximum economy and efficiency. Consideration shall be given to additional work that may be needed to achieve this.

10.31.A3. Facility design consideration shall include site, building mass, orientation, configuration, fenestration, and other features relative to passive and active energy systems.

10.31.A4. Insofar as practical, the facility ~~should~~shall include provisions for recovery of waste cooling and heating energy (ventilation, exhaust, water and steam discharge, cooling towers, incinerators, etc.).

***10.31.A5.** Facility design consideration shall include recognized energy-saving mechanisms such as variable air volume (VAV) systems, load shedding, programmed controls for unoccupied periods (nights

and weekends, etc.), and use of natural ventilation, site and climatic conditions permitting. ~~Systems with excessive installation and/or maintenance costs that negate long-range energy savings should be avoided.~~

10.31.A6. Air-handling systems shall be designed with an economizer cycle where appropriate to use outside air. (Use of mechanically circulated outside air does not reduce need for filtration.)

It may be practical in many areas to reduce or shut down mechanical ventilation ~~during~~under appropriate climatic and patient care conditions and to use open windows for ventilation.

10.31.A8. Mechanical equipment, ductwork, and piping shall be mounted on vibration isolators as required to prevent unacceptable structure-borne vibration.

10.31.A9. Supply and return mains and risers for cooling, heating, and steam systems shall be equipped with valves to isolate the various sections of each system. Each piece of equipment shall have valves at the supply and return ends.

10.31.B. Thermal and Acoustical Insulation

10.31.B1. Insulation shall be provided within the building ~~shall be provided~~ to conserve energy, protect personnel, prevent vapor condensation, and reduce noise.

10.31.B2. Insulation on cold surfaces shall include an exterior vapor barrier. (Material that will not absorb or transmit moisture will not require a separate vapor barrier.)

10.31.B3. Insulation, including finishes and adhesives on the exterior surfaces of ducts, piping, and equipment, shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less as determined by an independent testing laboratory in accordance with NFPA 255.

10.31.B4. If duct lining is used, it shall be coated and sealed, and shall meet ASTM C1071. These linings (including coatings, adhesives, and exterior surface insulation on pipes and ducts in spaces used as air supply plenums) shall have a flame-spread rating of 25 or less and a smoke-developed rating of 50 or less, as determined by an independent testing laboratory in accordance with NFPA 255. If existing lined ductwork is reworked in a renovation project, the liner seams and punctures shall be resealed.

10.31.B5. Existing accessible insulation within areas of facilities to be modernized shall be inspected, repaired, and/or replaced, as appropriate.

10.31.B6. Duct lining shall not be installed within 15 feet (4.57 meters) downstream of humidifiers.

10.31.C. Steam and Hot Water Systems

10.31.C1. Boilers shall have the capacity, based upon the net ratings published by the Hydronics Institute or another acceptable national standard, to supply the normal heating, hot water, and steam requirements of all systems and equipment. Their number and arrangement shall accommodate facility needs despite the breakdown or routine maintenance of any one boiler. The capacity of the remaining boiler(s) shall be sufficient to provide hot water service for clinical, dietary, and patient use; steam for sterilization and dietary purposes; and heating for operating, recovery, and general patient rooms. However, reserve capacity for facility space heating is not required in geographic areas where a design dry-bulb temperature of 25°F (-4°C) or more represents not less than 99 percent of the total hours in any one heating month as noted in ASHRAE's *Handbook of Fundamentals*, under the "Table for Climatic Conditions for the

United States."

10.31.C2. Boiler accessories, including feed pumps, heat-circulating pumps, condensate return pumps, fuel oil pumps, and waste heat boilers, shall be connected and installed to provide both normal and standby service.

10.31.D. Heating, Ventilation, and Air Conditioning, ~~(HVAC) Heating, and Ventilation Systems~~

10.31.D1. All rooms and areas in the facility used for patient care shall have provisions for ventilation. The ventilation rates shown in Table 7.2 shall be used only as minimum standards; they do not preclude the use of higher, more appropriate rates. ~~Although natural window ventilation for nonsensitive areas and patient rooms may be employed is permitted, weather permitting, availability of~~ mechanical ventilation ~~should shall~~ be considered for use in interior areas and during periods of temperature extremes. Fans serving exhaust systems shall be located at the discharge end and shall be readily serviceable. Air supply and exhaust in rooms for which no minimum total air change rate is noted may vary down to zero in response to room load. For rooms listed in Table 7.2, where VAV systems are used, minimum total air change shall be within limits noted. ~~Temperature control shall also comply with these standards. Space temperature and relative humidity shall be as indicated in Table 7.2.~~ To maintain asepsis control, airflow supply and exhaust ~~should shall~~ generally be controlled to ensure movement of air from "clean" to "less clean" areas, especially in critical areas. The ventilation systems shall be designed and balanced according to the requirements shown in Table 7.2 and in the applicable notes.

For renovation projects, prior to the start of construction, and preferably during the design, airflow and static pressure measurements shall be taken at the connection points of new ductwork to existing systems. This information shall be used by the designer to determine if existing systems have sufficient capacity for the intended new purposes, and for any required modifications to the existing system to be included in the design documentation.

10.31.D2. General exhaust systems may be combined to enhance the efficiency of recovery devices required for energy conservation. Local exhaust systems shall be used whenever possible in place of dilution ventilation to reduce exposure to hazardous gases, vapors, fumes, or mists.

Exhaust outlets from areas that may be contaminated shall be above roof level, arranged to minimize recirculation of exhaust air into the building, and directed away from personnel service areas.

10.31.D3. Fresh air intakes shall be located at least 25 feet (7.62 meters) from exhaust outlets of ventilating systems, combustion equipment stacks, medical-surgical vacuum systems, plumbing vents, or areas that may collect vehicular exhaust or other noxious fumes. (Prevailing winds and/or proximity to other structures may require greater clearances. **[Clemson: appendix?]**) Plumbing and vacuum vents that terminate at a level above the top of the air intake may be located as close as 10 feet (3.05 meters). The bottom of outdoor air intakes serving central systems shall be as high as practical, but at least 6 feet (1.83 meters) above ground level, or, if installed above the roof, 3 feet (0.91 meter) above roof level. ~~Exhaust outlets from areas that may be contaminated shall be above roof level, arranged to minimize recirculation of exhaust air into the building, and directed away from personnel service areas.~~

10.31.D4. All central ventilation or air conditioning systems shall be equipped with filters with efficiencies equal to, or greater than, those specified in Table 7.3. Where two filter beds are required, filter bed no. 1 shall be located upstream of the air conditioning equipment and filter bed no. 2 shall be downstream of any fan or blowers. Filter efficiencies, tested in accordance with ASHRAE 52.1-92, shall be average. Filter frames shall be durable and proportioned to provide an airtight fit with the enclosing duct-work. All joints

between filter segments and enclosing duct-work shall have gaskets or seals to provide a positive seal against air leakage. A manometer shall be installed across each filter bed having a required efficiency of 75 percent or more, including hoods requiring HEPA filters. Provisions shall be made to allow access for field testing.

***10.31.D5.** If duct humidifiers are located upstream of the final filters, they shall be ~~located~~ at least 15 feet (4.57 meters) upstream of the final filters. Ductwork with duct-mounted humidifiers shall have a means of water removal. An adjustable high-limit humidistat shall be located downstream of the humidifier to reduce the potential ~~of-for~~ condensation in the duct. All duct takeoffs ~~should-shall~~ be sufficiently downstream of the humidifier to ensure complete moisture absorption. Steam humidifiers shall be used. Reservoir-type water spray or evaporative pan humidifiers shall not be used.

10.31.D6. Air-handling duct systems shall be designed with accessibility for duct cleaning; and shall meet the requirements of NFPA 90A.

10.31.D7. Ducts that penetrate construction intended for ~~Xx~~-ray or other ray protection shall not impair the effectiveness of the protection.

10.31.D8. Fire and smoke dampers shall be constructed, located, and installed in accordance with the requirements of NFPA 101, 90A, and the specific damper's ~~L~~isting requirements. Fans, dampers, and detectors shall be interconnected so that damper activation will not damage ducts. Maintenance access shall be provided at all dampers. All damper locations ~~should-shall~~ be shown on design drawings. Dampers ~~should-shall~~ be activated ~~by fire or smoke sensors, not by fan cutoff alone in accordance with NFPA 90A.~~ Switching systems for restarting fans may be installed for fire department use in venting smoke after a fire has been controlled. However, provisions should be made to avoid possible damage to the system due to closed dampers. When smoke partitions are required, heating, ventilation, and air conditioning zones shall be coordinated with compartmentation insofar as practical to minimize need to penetrate fire and smoke partitions.

10.31.D9. Hoods and safety cabinets may be used for normal exhaust of a space providing minimum air change rates are maintained. If air change standards in Table 7.2 do not provide sufficient air for proper operation of exhaust hoods and safety cabinets (when in use), makeup air (filtered and preheated) ~~should~~ ~~shall~~ be provided around these units to maintain the required airflow direction and exhaust velocity. Use of makeup air will avoid dependence upon infiltration from outdoors and/or from contaminated areas. Makeup systems for hoods shall be arranged to minimize "short circuiting" of air and to avoid reduction in air velocity at the point of contaminant capture.

10.31.D10. Laboratory fume hoods shall meet the following general standards:

- a. Have an average face-velocity of at least 75 feet per minute (0.38 meters per second).
- b. Be connected to an exhaust system to the outside ~~which-that~~ is separate from the building exhaust system.
- c. Have an exhaust fan located at the discharge end of the system.
- d. Have an exhaust duct system of noncombustible corrosion-resistant material as needed to meet the planned ~~usage-use~~ of the hood.

10.31.D11. Laboratory hoods shall meet the following special standards:

a. Fume hoods, and their associated equipment in the air stream, intended for use with perchloric acid and other strong oxidants, shall be constructed of stainless steel or other material consistent with special exposures, and shall be provided with a water wash and drain system to permit periodic flushing of duct and hood. Electrical equipment intended for installation within such ducts shall be designed and constructed to resist penetration by water. Lubricants and seals shall not contain organic materials. When perchloric acid or other strong oxidants are only transferred from one container to another, standard laboratory fume hoods and the associated equipment may be used in lieu of stainless steel construction.

b. In new construction and major renovation work, each hood used to process infectious or radioactive materials shall have a minimum face velocity of 90 to 110 feet per minute (0.46 to 0.56 meter per second) with suitable pressure-independent air modulating devices and alarms to alert staff of fan shutdown or loss of airflow. Each shall also have filters with a 99.97 percent efficiency ~~{(based on the dioctyl-phthalate (DOP) test method)}~~ in the exhaust stream, and shall be designed and equipped to permit the safe removal, disposal, and replacement of contaminated filters. Filters shall be as close to the hood as practical to minimize duct contamination. Fume hoods intended for use with radioactive isotopes shall be constructed of stainless steel or other material suitable for the particular exposure and shall comply with NFPA 801, *Facilities for Handling Radioactive Materials*. **Note:** Radioactive isotopes used for injections, etc., without probability of airborne particulates or gases may be processed in a clean-workbench-type hood where acceptable to the Nuclear Regulatory Commission.

10.31.D12. Exhaust hoods handling grease-laden vapors in food preparation centers shall comply with NFPA 96. All hoods over cooking ranges shall be equipped with grease filters, fire extinguishing systems, and heat-actuated fan controls. Cleanout openings shall be provided every 20 feet (6.10 meters) and at changes in direction in the horizontal exhaust duct systems serving these hoods. ~~(Horizontal runs of ducts serving range hoods should shall be kept to a minimum.)~~

10.31.D13. The ventilation system for the space that houses ethylene-oxide (ETO) sterilizers ~~should shall~~ be designed to:

a. Provide a dedicated (not connected to a return air or other exhaust system) exhaust system. Refer to 29 CFR Part 1910.1047.

b. All source areas shall be exhausted, including the sterilizer equipment room, service/aeration areas, over the sterilizer door, and the aerator. If the ETO cylinders are not located in a well-ventilated, unoccupied equipment space, an exhaust hood shall be provided over the cylinders. The relief valve shall be terminated in a well-ventilated, unoccupied equipment space, or outside the building. If the floor drain which the sterilizer(s) discharges to is not located in a well-ventilated, unoccupied equipment space, an exhaust drain cap shall be provided (coordinate with local codes).

c. Ensure that general airflow is away from sterilizer operator(s).

d. ~~Provide a~~ dedicated exhaust duct system for ETO ~~shall be provided~~. The exhaust outlet to the atmosphere ~~should shall~~ be at least 25 feet (7.62 meters) away from any air intake.

e. An audible and ~~visual-visible~~ alarm shall activate in the sterilizer work area, and ~~in~~ a 24-hour staffed location, upon loss of airflow in the exhaust system.

10.31.D14. Rooms with fuel-fired equipment shall be provided with sufficient outdoor air to maintain equipment combustion rates and to limit work station temperatures.

10.31.D15. Gravity exhaust may be used, where conditions permit, for nonpatient areas such as boiler rooms, central storage, etc.

10.31.D16. The energy-saving potential of variable air volume systems is recognized, and these standards ~~herein in this document~~ are intended to maximize appropriate use of ~~that such~~ systems. Any system ~~utilized~~ used for occupied areas shall include provisions to avoid air stagnation in interior spaces where thermostat demands are met by temperatures of surrounding areas.

10.31.D17. Rooms used for sputum induction, aerosolized pentamidine treatments, or other cough-inducing procedures shall meet the requirements of Table 7.2 for airborne infection isolation rooms. If booths are used, refer to Section 7.15.

10.31.D18. Non-central air-handling systems; (i.e., individual room units that are used for heating and cooling purposes) (fan-coil units, heat pump units, etc.) shall be equipped with permanent (cleanable) or replaceable filters. The filters shall have a minimum efficiency of 68 percent weight arrestance (MERV 3). These units may be used as recirculating units only. All outdoor air requirements shall be met by a separate central air handling system with the proper filtration, as noted in Table 7.3.

10.31.E. Plumbing and Other Piping Systems

Unless otherwise specified herein, all plumbing systems shall be designed and installed in accordance with *National Standard Plumbing Code*, chapter 14, Medical Care Facility Plumbing Equipment.

10.31.E1. The following standards shall apply to plumbing fixtures:

- a. The material used for plumbing fixtures shall be nonabsorptive and acid-resistant.
- b. Water spouts used in lavatories and sinks shall have clearances adequate to avoid contaminating utensils and the contents of carafes, etc.
- c. General handwashing stations used by medical and nursing staff and all handwashing stations used by patients and food handlers shall be trimmed with valves that can be operated without hands. (Single lever or wrist blade devices may be used.) Blade handles used for this purpose shall not exceed 4-1/2 inches (114.3 millimeters) in length. Handles on clinical sinks shall be at least 6 inches (152.4 millimeters) long. Freestanding scrub sinks and handwashing stations used for scrubbing in procedure rooms shall be trimmed with foot, knee, or ultrasonic controls (no single lever wrist blades).
- d. Clinical sinks shall have an integral trap wherein the upper portion of the water trap provides a visible seal.
- e. Showers and tubs shall have nonslip walking surfaces.

10.31.E2. The following standards shall apply to potable water supply systems:

- a. Systems shall be designed to supply water at sufficient pressure to operate all fixtures and equipment during maximum demand. Supply capacity for hot- and cold-water piping shall be determined on the basis of fixture units, using recognized engineering standards. When the ratio of plumbing fixtures to occupants is proportionally more than required by the building occupancy and is in excess of 1,000 plumbing fixture units, a diversity factor is permitted.

b. Each water service main, branch main, riser, and branch to a group of fixtures shall have valves. Stop valves shall be provided for each fixture. Appropriate panels for access shall be provided at all valves where required.

c. Vacuum breakers or backflow prevention devices shall be installed on hose bibs and supply nozzles used for connection of hoses or tubing in ~~laboratories~~, housekeeping sinks, bedpan-flushing attachments, ~~and autopsy tables~~, etc.

d. Bedpan-flushing devices (may be cold water) shall be provided in each inpatient toilet room.

e. Potable water storage vessels (hot and cold) not intended for constant use shall not be installed.

f. Systems shall be protected against cross-connection in accordance with American Water Works Association (AWWA) Recommended Practice for Backflow Prevention and Cross-Connection Control.

10.31.E3. The following standards shall apply to hot water systems:

a. The water-heating system shall have sufficient supply capacity at the temperatures and amounts indicated in Table 7.4. Water temperature is measured at the point of use or inlet to the equipment. Water ~~shall~~ may be ~~permitted to be~~ stored at higher temperatures.

b. Hot-water distribution systems serving patient care areas shall be under constant recirculation to provide continuous hot water at each hot water outlet. Non-recirculated fixture branch piping shall not exceed 25 feet (7.62 meters) in length.

*c. Provisions shall be included in the domestic hot water system to limit the amount of *Legionella* bacteria and opportunistic waterborne pathogens.

d. Dead-end piping (risers with no flow, branches with no fixture) shall not be installed. In renovation projects, dead-end piping shall be removed. Empty risers, mains, and branches installed for future use shall be permitted.

10.31.E4. The following standards shall apply to drainage systems:

a. Drain lines from sinks used for acid waste disposal shall be made of acid-resistant material.

b. Drain lines serving some types of automatic blood-cell counters ~~must~~ shall be of carefully selected material that will eliminate potential for undesirable chemical reactions (and/or explosions) between sodium azide wastes and copper, lead, brass, ~~and~~ solder, etc.

c. Insofar as possible, drainage piping shall not be installed within the ceiling or exposed in operating rooms, food preparation centers, food serving facilities, food storage areas, central services, electronic data processing areas, electric closets, and other sensitive areas. Where exposed, overhead drain piping in these areas is unavoidable, special provisions shall be made to protect the space below from leakage, condensation, or dust particles.

d. Floor drains shall not be installed in operating rooms.

e. If a floor drain is installed in cystoscopy, it shall contain a nonsplash, horizontal-flow flushing bowl

beneath the drain plate.

f. Drain systems for autopsy tables shall be designed to positively avoid splatter or overflow onto floors or back siphonage and for easy cleaning and trap flushing.

g. Building sewers shall discharge into community sewerage. Where such a system is not available, the facility shall treat its sewage in accordance with local and state regulations.

h. Kitchen grease traps shall be located and arranged to permit easy access without the need to enter food preparation or storage areas. Grease traps shall be of capacity required and shall be accessible from outside ~~of~~ the building without need to interrupt any services.

i. Where plaster traps are used, provisions shall be made for appropriate access and cleaning.

j. In dietary areas, floor drains and/or floor sinks shall be of type that can be easily cleaned by removal of cover. ~~Provide f~~ Floor drains or floor sinks shall be provided at all "wet" equipment (as ice machines) and as required for wet cleaning of floors. ~~Provide r~~ Removable stainless steel mesh in addition to grilled drain covers shall be provided to prevent entry of large particles of waste ~~which-that~~ might cause stoppages. Location of floor drains and floor sinks shall be coordinated to avoid conditions where locations of equipment make removal of covers for cleaning difficult.

10.31.E5. The installation, testing, and certification of nonflammable medical gas and air systems shall comply with the requirements of NFPA 99. (See Table 7.5 for rooms requiring station outlets.)

10.31.E6. Clinical vacuum system installations shall be in accordance with NFPA 99. (See Table 7.5 for rooms ~~which~~ requireing station outlets.)

10.31.E7. All piping, except control-line tubing, shall be identified. All valves shall be tagged, and a valve schedule shall be provided to the facility owner for permanent record and reference.

10.31.E8. Where the functional program includes hemodialysis, continuously circulated filtered cold water shall be provided. Piping shall be in accordance with ANSI/AAMI RD62, *Water Treatment Equipment for Hemodialysis Applications*.

10.31.E9. ~~Provide e~~ Condensate drains for cooling coils shall be of a type that ~~may-can~~ be cleaned as needed without disassembly. (Unless specifically required by local authorities, traps are not required for condensate drains.) ~~Provide An~~ air gap shall be provided where condensate drains empty into floor drains. ~~Provide h~~ Heater elements shall be provided for condensate lines in freezers or other areas where freezing may be a problem.

10.31.E10. No plumbing lines ~~may~~ shall be exposed overhead or on walls where possible accumulation of dust or soil may create a cleaning problem or where leaks would create a potential for food contamination.

10.32. Electrical Standards

10.32.A. General

10.32.A1. All electrical material and equipment, including conductors, controls, and signaling devices, shall be installed in compliance with applicable sections of NFPA 70 and NFPA 99 and shall be listed as complying with available standards of listing agencies or other similar established standards where such

standards are required.

10.32.A2. The electrical installations, including alarm, nurse call, and communication systems, shall be tested to demonstrate that equipment installation and operation is appropriate and functional. A written record of performance tests on special electrical systems and equipment shall show compliance with applicable codes and standards.

10.32.A3. Data processing and/or automated laboratory or diagnostic equipment, if provided, may require safeguards from power line disturbances.

10.32.B. Services and Switchboards

Main switchboards shall be located in an area separate from plumbing and mechanical equipment and shall be accessible to authorized persons only. Switchboards shall be convenient for use, readily accessible for maintenance, away from traffic lanes, and located in dry, ventilated spaces free of corrosive or explosive fumes, gases, or any flammable material. Overload protective devices shall operate properly in ambient room temperatures.

10.32.C. Panelboards

Panelboards serving normal lighting and appliance circuits shall be located on the same floor as the circuits they serve. Panelboards serving critical branch emergency circuits shall be located on each floor that has major users. Panelboards serving Life Safety emergency circuits may also serve floors above and/or below.

10.32.D. Lighting

10.32.D1. Lighting shall be engineered to the specific application.

10.32.D2. The Illuminating Engineering Society of North America (IES) has developed recommended lighting levels for health care facilities. ~~The reader should refer to the~~ IES publication RP-29, *Lighting for Hospitals and Health Care Facilities*, IES Handbook (1993).

10.32.D3. Approaches to buildings and parking lots and all occupied spaces shall have lighting fixtures ~~for lighting~~ that can be illuminated as necessary.

10.32.D4. Patient rooms shall have general lighting and night lighting. A reading light shall be provided for each patient. Reading light controls shall be readily accessible to the patient(s). Incandescent and halogen light sources ~~which that~~ produce heat ~~should shall~~ be avoided to prevent burns to the patient and/or bed linen. Unless specifically designed to protect the space below, ~~T~~he light source ~~should shall~~ be covered by a diffuser or lens.

10.32.D5. Nursing unit corridors shall have general illumination with provisions for reducing light levels at night.

10.32.D6. Consideration should be given to the special needs for the elderly. Excessive contrast in lighting levels that make effective sight adaptation difficult should be minimized. Refer to IES publication RP-28, *Lighting and the Visual Environment for Senior Living*.

10.32.E. Receptacles (Convenience Outlets)

10.32.E1. Each patient room shall have duplex-grounded receptacles. There shall be one at each side of the head of each bed and one on every other wall. Receptacles may be omitted from exterior walls where construction or room configuration makes installation impractical.

10.32.E2. Duplex-grounded receptacles for general use shall be installed approximately 50 feet (15.24 meters) apart in all corridors and within 25 feet (7.62 meters) of corridor ends.

10.32.E3. Electrical receptacle cover plates or electrical receptacles supplied from the emergency system shall be distinctively colored or marked for identification. If color is used for identification purposes, the same color ~~should~~shall be used throughout the facility.

10.32.F. Equipment

10.32.F1. Ground-fault circuit interrupters (GFCIs) shall comply with NFPA 70. ~~When~~Where GFCIs are used in critical areas, provisions shall be made to ensure that other essential equipment is not affected by activation of one interrupter.

10.32.F2. Fixed and mobile ~~x~~X-ray equipment installations shall conform to articles 517 and 660 of NFPA 70.

10.32.F3. Special equipment is identified in the following sections: Nursing Units [\(10.15\)](#), Support Areas, ~~Rehabilitation-Physical~~ Therapy [\(10.17\)](#), [Occupational Therapy \(10.18\)](#), and Imaging [\(10.2.E\)](#) if applicable. These sections shall be consulted to ensure compatibility between programmatically defined equipment needs and appropriate power and other electrical connection needs.

10.32.G. Nurse Calling System

10.32.G1. A nurses calling system shall be provided. Each bed shall be provided with a call device. Two call devices serving adjacent beds may be served by one calling station. Calls shall activate a visible signal in the corridor at the patient's door or other appropriate location. In multicorridor nursing units, additional visible signals shall be installed at corridor intersections.

10.32.G2. A nurses emergency call shall be provided at each inpatient toilet, bath, sitz bath, and shower room. This emergency call shall be accessible to a collapsed patient lying on the floor. Inclusion of a pull cord will satisfy this standard. The emergency call shall be designed so that a signal activated at a patient's calling station will initiate a visible and audible signal distinct from the regular nurse calling system that can be turned off only at the patient calling station. The signal shall activate an annunciator panel at the nurses' station or other appropriate location, a visible signal in the corridor at the patient's door, and at other areas defined by the functional program.

10.32.G3. Alternate technologies ~~can~~may~~shall~~ be ~~permitted~~considered for emergency or nurse call systems. If radio frequency systems are utilized, consideration ~~should~~shall be given to electromagnetic compatibility between internal and external sources.

10.32.H. Emergency Electrical Service

10.32.H1. As a minimum, nursing facilities or sections thereof shall have emergency electrical systems as required in NFPA 101, NFPA 110, and NFPA 99.

| **10.32.H2.** ~~When~~ Where the nursing facility is a distinct part of an acute-care hospital, it may use the emergency generator system for required emergency lighting and power, if such sharing does not reduce hospital services. Such a shared system shall be designed with the capacity to meet the needs of both the hospital and rehabilitation facilities. Life support systems and their respective areas shall be subject to applicable standards of Section 7.32.

10.32.H3. An emergency electrical source shall provide lighting and/or power during an interruption of the normal electric supply.

10.32.I. Fire Alarm System

Fire alarm and detection systems shall be provided in compliance with NFPA 101 and NFPA 72.

10.32.J. Telecommunications and Information Systems

10.32.J1. Locations for terminating telecommunications and information system devices shall be provided.

10.32.J2. An area shall be provided for central equipment locations. Special air conditioning and voltage regulation shall be provided when recommended by the manufacturer.

A10.7.A. Services may consist of an on-site conventional food preparation system, a convenience food service system, or an appropriate combination thereof. On-site facilities should be provided for emergency food preparation and refrigeration.

A10.31.A5. Systems with excessive installation and/or maintenance costs that negate long-range energy savings should be avoided.

A10.31.D5. One way to achieve basic humidification ~~is may be accomplished~~ by using a steam-jacketed manifold-type humidifier, with a condensate separator that delivers high-quality steam. Additional booster humidification (if required) should be provided by steam-jacketed humidifiers for each individually controlled area. Steam to be used for humidification may be generated in a separate steam generator. The steam generator feed water may be supplied either from soft or reverse osmosis water. Provisions should be made for periodic leaning.

A10.31.E3.c. There are several ways to treat domestic water systems to kill *Legionella* and opportunistic waterborne pathogens. Complete removal of these organisms is not feasible, but methods to reduce the amount include hyperchlorination (free chlorine, chlorine dioxide, monochloramine), elevated hot water temperature, ozone injection, silver/copper ions, and ultraviolet light. Each of these options has advantages and disadvantages. While increasing the hot water supply temperature to 140°F (60°C) is typically considered the easiest option, the risk of scalding, especially to youth and the elderly, is significant. Additional consideration should be given to domestic water used in bone marrow transplant units. See CDC, ASHRAE, and ASPE documentation for additional information.